

CS13: Remediation Monitoring Using Vertebrae During PARM

SITE

Comfuel #2- Ocala, FL
FAC.ID-8511062

BACKGROUND

The Vertebrae Well System (VWS) has been utilized at the Comfuel #2 site to implement an ozone sparging remediation strategy. Multiple VWS were installed while the subject property was undergoing site development. However, this redevelopment also resulted in most of the existing vertical monitoring wells being destroyed. Following the sampling protocol outlined by the FDEP, the consultant sampled the independent vertebrae well segments to monitor performance and to also make system adjustments based on the sample data. This case study will demonstrate the effectiveness of using the VWS for monitoring data, to not only aid in remediation, but also as a potential post active remediation monitoring tool.

SAMPLING ACTIVITIES

An array of 10 shallow vertebrae well segments and 10 deep vertebrae well segments were chosen to be used for performance monitoring sampling during the ozone remedial system operation. During the five quarters of operation the vertebrae wells were

sampled up to 6 times to monitor the progress. Table 1 shows the results from one shallow vertebrae segment (20' bls). We only illustrate one to show the concept here, but the full reports can be retrieved online for more info. With the additional data from the VWS, the client was able to confidently move into post active remediation monitoring (PARM).

Well Sampled	Date	Benzene	Toluene	Ethylbenzene	Xylene
BY-3 shallow	8/14/2019	12	24	39	69
	12/9/2019	2.6	.49 U	.38 U	1.1 U
	3/9/2020	.18 U	.49 U	5.1	2.7
	11/24/2020	.64 I	1.5	6	16.6
	3/5/2021	.46 I	1.9	6.1	19.2

SAMPLING PROTOCOL

The use of ozone at this particular site allowed for faster sampling times between system shut down and groundwater samples since the half-life of ozone is approximately 10-20 minutes. Prior to sampling, the system was shut down and allowed to rest ranging from a few hours and up to a month. Sampling protocol remains similar to that of a vertical well and follows purging volumes as calculated from total well length and a low flow purge rate.

CONCLUSIONS

In summary, the sample data gathered from the Vertebrae Well System proved invaluable during active remediation, as well as when it came time to move to PARM monitoring. On a site with limited available vertical data after redevelopment activities, including the GW data collected from the 20 independent vertebrae well segments filled in the gaps and verified the cleanup of the on-site plume. With the acceptance by the FDEP to use the Vertebrae Well System for performance monitoring, the site has moved to PARM. Roadways, site access limitations, and buildings are no longer an issue when the VWS is employed as additional monitoring points.

